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One-way Disc Plow

**...ADJUSTMENT
AND
OPERATION**



Cooperative Extension Service:
South Dakota State University
and U. S. Department of Agriculture

One-way Disc Plow ...ADJUSTMENT AND OPERATION

by G. R. DURLAND, extension agricultural engineer

The one-way disk plow is known by various names—*disk tiller, harrow plow, wheatland plow, cylinder plow and vertical disk plow*. These are all basically the same machine, being a compromise between the standard disk plow and the one-way disk harrow.

The one-way disk plow came into widespread use in the Great Plains area about 1927. It was originally intended to be a one-way disk harrow but, as its use increased, farmers began to attempt to do a job of plowing with the machines. The manufacturers redesigned and built the machine so that today it is really a one-way disk plow.

Common belief is that the one-way disk plow is a very poor conservation implement. Its use is quite commonly abused and when this is done, it pulverizes the soil and contributes materially to soil blowing. However, if the one-way disk plow is adjusted and operated properly with the proper soil and moisture conditions, it is a valuable tillage tool that can be a good conservation tillage machine.

Tests that have been made in the Great Plains area indicate that high speed is costly because of increased power needed to pull the implement. It is also costly in a conservation practice because it pulverizes the top soil and destroys the surface trash covering that would be obtained under normal speed operation. For most efficient operation it is suggested speed be kept to four miles per hour or less.

ADJUSTMENT

The successful adjustment of a one-way requires time and patience. Adjustments made properly will pay dividends in the form of better weed cutting less side draft, and better overall performance. The principle of adjustments mentioned here applies to all makes, although the method of adjustment will vary between makes. The proper method can be obtained from the operators instruction manual.

Angle of cut determines the depth at which the one-way operates. A large angle is used when ground is hard and more penetration is needed. This gives a better job of cutting weeds. A small angle and shallow cut is used to remove light weed growth, volunteer

growth or to roughen ground to prevent blowing. The large angle and small angle are illustrated in Figure 1. This adjustment is usually made by loosening rear end of frame and swinging the rear furrow wheel to desired position.

Two points must be considered in adjusting the one-way: **center of pull** and **center of draft**. The center pull is located at the pin where the swinging drawbar fastens to the tractor frame. From this point both horizontal and vertical pull adjustments are made.

The horizontal center of draft usually is in the center of cut. If the one-way has larger disks the center of draft moves slightly towards the plowed ground. The vertical center of draft is always at the point which is the horizontal center of draft and in the ground approximately one-half the depth of the furrow being plowed. A string stretched between the

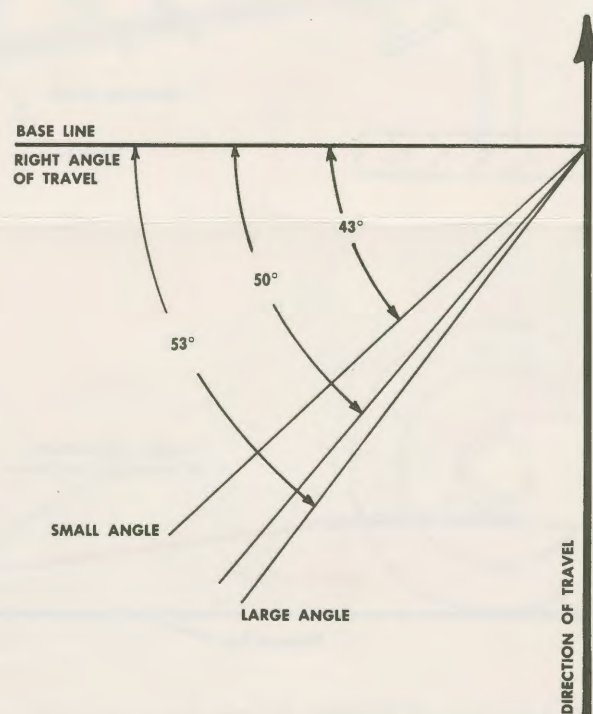


Figure 1. Angle adjustment of the one-way.

center of pull and center of draft will show true lines of action and help make the vertical and horizontal adjustments easier. The dotted lines in Figure 2 indicate line of action.

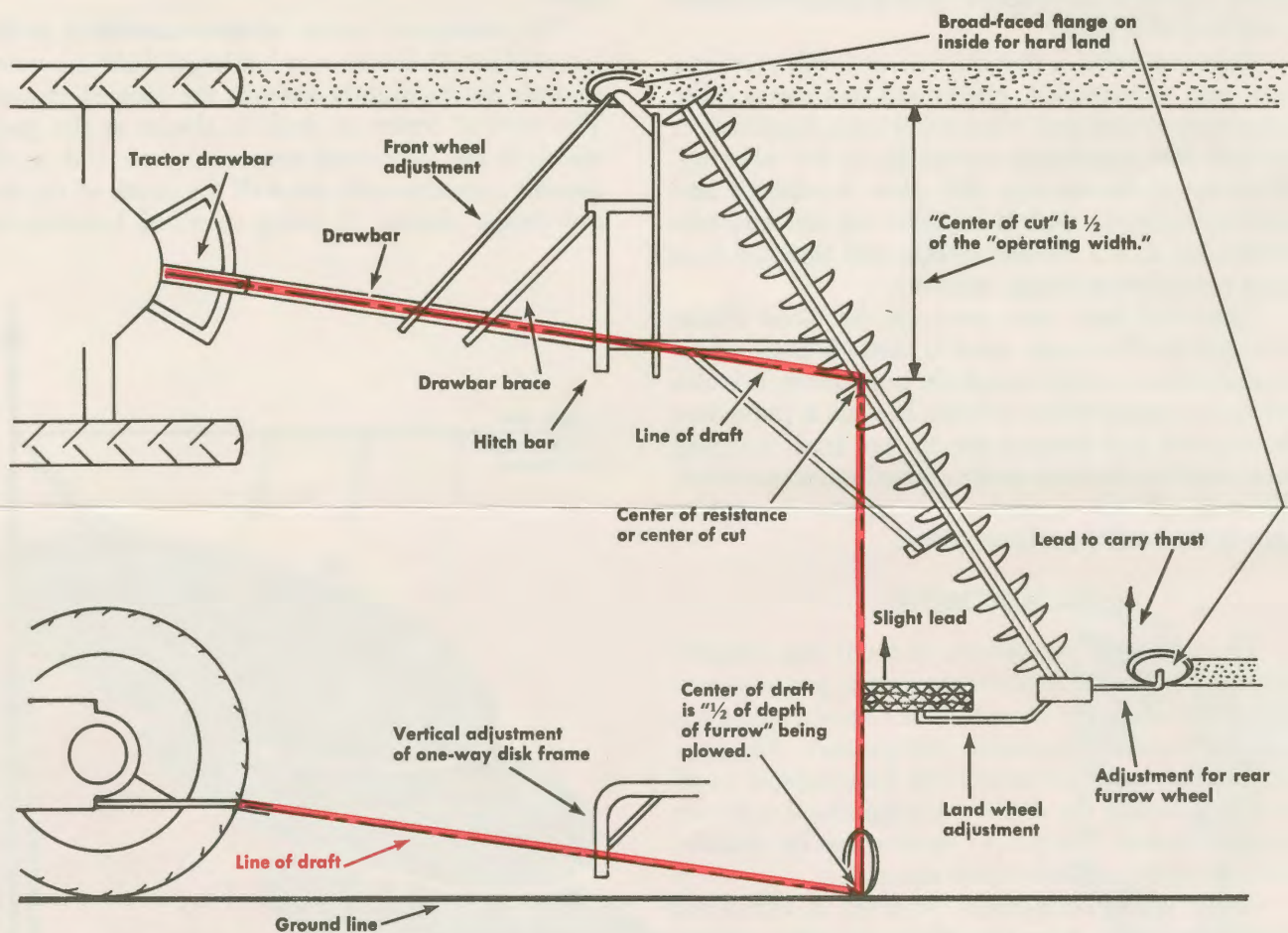
The horizontal adjustment will determine the amount of side draft on the one-way and tractor. To make this adjustment, place the tractor and one-way in the position in which they will be operating, with front disk of one-way cutting one inch less than the others. Stretch a string between the center of pull and center of draft to show line of action. The tractor drawbar and the one-way hitch, part that attaches to tractor drawbar, should follow this line. If they don't, change the one-way hitch to make the hitch coincide with line of action.

The vertical hitch adjustment is the most important on a one-way. If tractor drawbar is too low or one-way drawbar too high, the one-way will tip forward and the rear furrow wheel will climb out of the

ground. Quite often weight is needed on the one-way to force disks into the ground. With proper vertical adjustment additional weights will not be needed. To correct a faulty hitch the tractor drawbar can be raised or one-way drawbar lowered. If machines are not designed so that vertical adjustments can be made, use an extension or offset hitch. The hitch on the one-way should be low enough so the tractor does not pull down on the one-way disk. In proper vertical adjustment, the hitch will be almost on the string stretched between the center of pull and center of draft.

Adjust one-way wheels so the load is carried evenly on all three wheels. The front furrow should have a slight lead towards the plowed ground. The rear furrow wheel should have enough lead towards plowing to hold machine with front disk cutting one inch less than the others. The ground wheel should be parallel to line of travel. The broad-faced rim of rear furrow wheel should be against furrow for all work.

Figure 2. One-way plow horizontal and vertical adjustment.



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